

SUMMARY OF THE RESULTS FROM THE INDIAN MAMMAL SURVEY

OF THE

BOMBAY NATURAL HISTORY SOCIETY.

(BY R. C. WROUGHTON.)

INTRODUCTION.

A SHORT HISTORY OF INDIAN MAMMALOGY.

The Golden Age of Indian Mammalogy was undoubtedly the second quarter of the nineteenth century, and equally without doubt the chief figure in it was Brian Houghton Hodgson. Before him only a very few adventurous foreign travellers such as Belanger, Leschenault, &c., did a little sporadic collecting.

Hodgson collected in Nepal from about 1830 to 1845, and the following is a list of some of his contemporaries who were interested in Mammalogy:—

Barbe, in Pegu.	Hutton, in Kandahar and Mussoorie.
Boys, in Rajputana.	McClelland, in Assam.
Berdmore, in Lower Burma.	Phayre, in Lower Burma.
Elliot, in S. Maratha Country.	Sykes, in the Dekhan.
Griffith, in N. W. Frontier and Assam.	Tickell, in Orissa.
Heath, in Madras.	Tytler, in Kumaon and Andamans.

While all these were collecting, Gray, in London, Blyth, in Calcutta, Jerdon, in Madras, and Kelaart, in Ceylon, were studying and classifying. It must not, however, be understood that the former only collected and the latter only studied. Quite the reverse is the case. Hodgson published many studies and caused to be made an exhaustive collection of drawings, by native artists, of the vertebrate fauna of Nepal, and almost all the others, mentioned in the list of collectors, published studies to a greater or less extent. Similarly, except Gray, all the students mentioned collected as opportunity offered.

After 1850, however, little was done, and there are scarcely any names of workers to record, the chief were Hume, especially in South Burma, Dr. Theobald, Col. Ward, in Kashmir, H. Ferguson, in Travancore, Maj. Birrell and Maj. Dunn in the Punjab and Capt. Whitehead, mostly in Central India as collectors, and Anderson, Blanford, Horsfield and Scully as students.

When Blanford prepared his "Mammalia," 25 years ago, he found but little in the National Collection to help him beyond the

remains of the collections of the early part of the century, and even up to and after the commencement of the present century the position was not much more satisfactory. In the early days collections consisted to a very large extent of spirit specimens, and where this was not so, the specimens were not only badly made up but no details of exact locality and date were recorded.

In 1911 this Society launched its Mammal Survey of India, which has now unfortunately been interrupted (temporarily let us hope) by the War, before its work was even half done, but not until some 17,000 specimens had been collected and despatched to the British Museum of Natural History for study.

SCOPE OF THIS SUMMARY.

About a year ago Mr. Thomas suggested to me that the present time and circumstances presented a favourable opportunity to summarise the results from the study of the Survey Collections. On approaching the task it was evident that if limited to a mere list of the forms obtained, both old and new, the Summary, though not without interest, would be of little practical value. Something of the sort will be found in an Appendix at the end of this Summary. When the restricted meaning which we have given to the word 'results' in the Journal, in connection with the survey, was widened to include also the *indirect* results, the question at once arose, where is the line to be drawn? The only logical solution appeared to be that the Summary must deal with all changes of the nomenclature adopted by Blanford in his Mammalia which have been shown to be necessary not only in the course of our study of the Survey material, but also by those of other Mammalogists who have worked at the subject since that work was published.

FORM OF THE SUMMARY.

A further and no less important question which had to be solved was the form to be given to the Summary. Blanford's Mammalia, though out of date, is still the recognised handbook of Indian Mammalogy, and it seemed absolutely necessary that the Summary should be kept in close touch with it. Very considerable changes have been adopted in nomenclature during the last 25 years. Groups treated as 'Genera' by Blanford are now in many cases accepted as 'Subfamilies,' each including several, often many, Genera. The only satisfactory way seemed to me to link the 'Mammalia' and the 'Summary' through the 'Species,' and to that end I adopted the following arrangements. The larger groups from 'Orders' down to and including 'Genera' have been arranged with keys at each stage. It should be remembered that all the keys in this Summary have been drawn

up for the forms found in India, Burma and Ceylon and that if applied to forms outside that fauna they will be found in many cases to be entirely misleading.

The information under each Genus has been arranged in three parts:—

Firstly.—In the margin are given the ‘No. and specific name,’ exactly as used by Blanford, while against them is recorded, as shortly as possible, the alterations and additions adopted since 1891, with references as far as possible to the places where the reasons for the changes in question are recorded in greater detail.

Secondly.—A key to the forms thus shown to be included in the Genus.

Thirdly.—A note headed DISTRIBUTION, under which the information is arranged under three heads.

“*Type locality*”.—The exact place, so far as it is ascertainable, where the type of the Species was taken, followed in brackets by the name of the Collector, where known. (It was originally suggested that I should record the name of the person who first took the species, but I found that this would require much more work than it was worth and I compromised as explained above.)

“*Other localities*”.—Blanford’s heading ‘Distribution,’ in view of the changes which it has been found necessary to make in his ‘species,’ has become actually misleading. The localities recorded here are those from which there are specimens in the National Collection, (B. M.), or those from which the form has been obtained by the Mammal Survey of India, (M.S.I.). (Where specimens other than the type have been obtained from the type locality that locality is repeated under this head. Where the entry is ‘none’ it denotes that the type specimen is still unique.)

“*Type*”.—Under this head it has been endeavoured to record as exactly as possible the present resting place of every type specimen. Where lists of types have been published (*e.g.*, Ind. Mus. Calcutta, U. S. Nat. Mus., &c.) the exact specimen is indicated, but elsewhere, though a probable place is denoted, this must not be taken as a guarantee that the type still exists. In a considerable number of cases, especially of Hodgson’s names, no one ‘type’ was selected by the author and in such cases the series on which the name was based have been treated as ‘co-types’ and after careful examination and investigation Thomas has fixed ‘Lectotypes’ (J. B. N. H. S., Vol. XXV, p. 368, 1918). These have been recorded here. Where the types or lectotypes of synonyms have been traced they have been recorded in brackets after the principal type.

DESIDERATA.

Our Honorary Secretary has suggested that a list of forms of which specimens are specially required should be added, but this I

have found to be quite impossible. Any Member who desires to help, and I hope there may be many, need only study the heading 'Other localities' and compare it with the Appendix to be able to see for himself the direction in which he can best help. I may take this opportunity however to point out that what is most required are series from the fauna which surrounds the Collector, and that recorded details of locality and date accompanying a specimen enormously increase its value, and finally that a series is very much more valuable than single specimens.

In conclusion I venture to offer my congratulations to Messrs. Millard and Kinnear on the great success of the Survey to date, which is so largely due to their untiring services in its organisation and administration, and to the work in the field of Messrs. Crump, Shortridge, Mayor, Prater, and N. A. Baptista. I trust that the example set by Mr. J. M. D. Mackenzie, I.F.S., in making collections in the Chin Hills and Pegu in aid of the Survey may find many imitators. Finally I desire to record my indebtedness to my friend Oldfield Thomas, who originally suggested this Summary, and without whose continuous advice and help I could not have completed it; also to Mr. W. R. Sherrin of the Natural History Museum, whose ever ready help in handling the specimens and recording the results has enormously lessened my labours.

SUMMARY.

MAMMALIA.

This class is represented in India by only one subclass, the placental mammals, or *Eutheria*.

Subclass: EUTHERIA.

This subclass contains nine Orders, which are arranged by Blanford in a key (slightly modified) as follows:—

Key to the orders of the EUTHERIA.

- I. Posterior limbs present.
 - A.—Hallux, or pollex, or both, opposable to other digits I. *Primates*.
 - B.—Neither hallux nor pollex opposable.
 - a. Animal modified for free flight in the air; fingers abnormally developed to support a membranous wing... II. *Chiroptera*.
 - b. Animal not modified for free flight in air.
 - a¹. Jaws armed with teeth.
 - a². Feet terminating in distinct toes, with claws or nails.

- a*⁴. Incisors in front of the upper and lower jaw, either not two in number, or not chisel shaped.
- a*⁴. Anterior and posterior limbs connected by an integumentary expansion forming a parachute; incisors compressed, multicuspitate IV. *Dermoptera*.
- b*⁴. Anterior and posterior limbs not joined to form a parachute; incisors conical.
- a*⁵. Snout very pointed; upper lip projecting far beyond lower; median pair of incisors larger than the others ... III. *Insectivora*.
- b*⁵. Upper lip, not projecting beyond lower; median pair smaller than the other incisors. V. *Carnivora*.
- b*³. Two chisel shaped incisors in front of each jaw ... VI. *Rodentia*.
- b*². Feet either not terminating in distinct toes, or furnished with hoofs, or hoof-shaped nails ... VII. *Ungulata*.
- b*². Jaws toothless ... VIII. *Edentata*.
- II. No external posterior limbs; body modified for swimming.
- A.—Homodont, or toothless; breathing orifice usually on top of head; mammae inguinal ... IX. *Cetacea*.
- B.—Heterodont; breathing orifice at end of snout; mammae pectoral ... X. *Sirenia*.

Order I. PRIMATES.

There are two Suborders, distinguishable as follows:—

Key to the Suborders of the PRIMATES.

- A.—Orbit completely enclosed by bone behind; pollex short, or wanting; second digit of foot with a nail; upper incisors not divided by a vacant space in the middle... I. *Anthropoidea*.

B.—Orbit opening behind into temporal fossa, beneath the postorbital arch ; pollex long ; second digit with a long claw ; upper incisors divided by a space in the middle II. *Lemuroidea*.

Suborder I. ANTHROPOIDEA.

Besides the HOMINIDÆ, there are two families recognisable at follows :

Key to the families of the ANTHROPOIDEA.

- A.—No tail ; arm longer than leg ... I. *Simiideæ*.
 B.—A tail present ; arm not longer than leg II. *Cercopithecidæ*.

Family I. SIMIIDÆ.

The family is represented by only one GENUS HYLOBATES. I have found no reason to make any changes in this group. I reproduce a key to the Genus from Blandford, for convenience of reference, as follows :—

Key to the species of HYLOBATES.

- A.—A white, or grey, band across the forehead ; hands and feet same colour as the body 1. *H. hoolock*, Harl.
 B.—Hands, feet, and a ring of hair surrounding the face, white or whitish... 2. *H. lar*, L.

DISTRIBUTION :—

1. *H. hoolock*, Harlan. *Type locality* :—Garo Hills. (Dr. Burrough).
Other localities :—Sadya, Upper Assam (B. M.), Upper Chindwin (M. S. I.).
Type :—Unknown.
 2. *H. lar*, Linnæus. *Type locality* :—"India."
Other localities :—S. W. Siam ; Malacca ; &c. (B. M.), Tenasserim (M. S. I.).
Type :—Unknown.

Family II. CERCOPITHECIDÆ.

The following is a key to the only two genera (Indian) of this family, viz. :—

Key to the genera of the CERCOPITHECIDÆ.

- A.—Cheek pouches ; tail variable ... I. *Macaca*.
 B.—No cheek pouches ; tail always long... II. *Pithecius*.

There is little doubt that the real name for this genus is *SIMIA*, but that name has been used for a long period of years for the Orang Utan, and it is now proposed to except it, by "fiat," from the strict rule of priority (Thomas. A. M. N. H. (8), xvii, p. 179, 1916). Pending the final settlement of this matter it seems most convenient to use the next oldest name. Blanford accepted Lacépède's name *MACACUS* (1801) but two years earlier the latter had used *MACACA* (Tabl. Mamm. 4, 1799).

Considerable misunderstanding seems to have arisen as to these two species owing to the loss of the type of *assamensis*, and the absence of topotypes. Study of the Survey specimens leads me to the conclusion that the *assamensis* of Blanford represents the macaques of the Chindwin and Shan States, and that *pelops*, Hodgson, is a distinct species (J. B. N. H. S., XXIV., p. 476, 1916). It seems to me impossible to lump these three species under one heading, viz. :— "Colour brown," as in Blanford's key, under A. b.

True (Proc. U. S. N. M., xvii, p. 2, 1894) has given the name of *villosus* to the Kashmir form of *rhesus*. (A specimen collected by Capt. F. D. Sterling at Kaotai, 3,600', Lower Chitral, sent to the B. M. for identification by the B. N. H. S., would seem to be this form.)

Blanford notes that neither *silenus* nor *veter* are applicable as names for this monkey, consequently the name *ferox*, Shaw (Mus. Lev., p. 69, 1792) must be used for it.

The name *nemestrinus*, L., was based on the form from Sumatra.

Miller established *adusta*, (Proc. U. S. N. Mus. xxix., p. 559, 1906)

No. 6. *arctoides*, Geoff. for the continental form, marked by

No. 7. *leoninus*, Bl. the almost complete absence of the

No. 8. *nemestrinus*, L. dorsal black stripe and by the black

No. 9. *cynomolgus*, Sshreb. annulations present in the hairs of

No. 10. *sinicus*, L. the back (J. B. N. H. S., xxiii,

No. 11. *pilaetus*, Shaw. p. 700, 1915). Blanford admittedly

uses the name *cynomolgus* wrongly (Mamm., p. 23.) Bonhote pointed out (Fasc. Mal. I, p. 4, 1903), that the oldest name for the Malay macaque is *fascicularis*, Raff. With these alterations the marginal list stands.

I propose to substitute for Blanford's the following modified key, viz. :—

Key to the species of MACACA.

A.—Tail less than three-fourths of head and body together.

- a.* Colour black, a grey ruff round face ... 1. *ferox* Shaw.
b. Colour brown or greenish grey.
*a*¹ Tail about half as long as head and body together.
*a*² Colour rich brown; size large (greatest length of skull 150 mm.). 2. *pelops*, Hodgs.
*b*² Colour greenish grey; size smaller (greatest length of skull 130mm.)
*a*³ Throat, chest, and abdomen, well haired, white.
*a*⁴. Hair comparatively short and sleek (45 mm.) ... 3. *r. rhesus*, And.
*b*⁴. Hair comparatively long and rough (80 mm.) ... 4. *r. villosus*, True.
*b*³ Throat, chest, and abdomen, very sparsely haired, greyish, or reddish ... [McCl.]
... 5. *assamensis*,
¹ Tail less than half the length of head and body.
*a*² Tail about one-third as long as head and body, very slender.
*a*³ A distinct horseshoe-shaped crest on the crown ... 6. *leonina*, Bly.
*b*³ No distinct crest ... 7. *adusta*, Mill.
*b*² Tail very short, only one or two inches long ... 8. *arctoides*, Geoff.
B. Tail more than three-fourths of head and body together.
a Hair of crown lengthened and distinctly radiating from the middle.
*a*¹. General colour greyish brown, not rufous ... 9. *sinica*, L.
b. General colour rufous or yellowish... 10. *pileata*, Shaw.
b Hair of crown neither lengthened nor radiating ... 11. *fascicularis*, Raff.

DISTRIBUTION :—

1. *M. ferox*, Shaw. *Type locality* :—Ceylon.
Other localities :—Ceylon (B. M.).
Type :—Unknown.
2. *M. pelops*, Hodgson. *Type locality* :—North Nepal (Hodgson).
Other localities.—Nepal (B.M.), Bataisia, Dikchu, Darjiling, Sikkim (M. S. I.).
Type :—B. M. No. 43.1.12.4.

3. *M. rhesus*, Audebert. *Type locality* :—Unknown.
Other localities :—Sikkim (Blanford) (B. M.); Central Provinces; Kumaon; Behar; Orissa; Darjiling; Bhutan Duars (M. S. I.).
Type :—Unknown (Type of *oinops*, Hodgson, B. H. No. 43.1.12.5).
4. *M. rhesus villosus*, True. *Type locality* :—Lolab Kashmir (Dr. Abbott).
Other localities :—None.
Type :—U.S.N.M. No. $\frac{20120}{35485}$.
5. *M. assamensis*, McClelland. *Type locality* :—Assam (McClelland).
Other localities :—Chindwin; Shan States; Mt. Popa (M. S. I.).
Type :—Lost. (Type of *problematicus*, Gray, B. M. No. 69.3.5.15; Type of *rheso-similis*, Sclater, B. M. No. 69.3.5.15).
6. *M. leonina*, Blyth. *Type locality* :—Arakan (Col. Phayre).
Other localities :—Arakan (B. M.); Chindwin (M.S.I.).
Type :—Ind. Mus. Calc. No. 43a.
7. *M. adusta*, Miller. *Type locality* :—Champang, Tenasserim (Dr. W. L. Abbott).
Other localities :—Malay Peninsula (B. M.); Tenasserim (M. S. I.).
Type :—U. S. N. Mus. No. 124023.
8. *M. arctoides*, Geoffroy. *Type locality* :—Cochin China (Diard).
Other localities :—Malay Peninsula (B. M.).
Type :—Unknown. Perhaps in Paris Museum. (Type of *melanotus*, Ogilby, B.M. No. 55.12.24.25; Type of *brunneus*, Anderson Ind. Mus. Calc. No. 45b.).
9. *M. sinica*, Linnæus. *Type locality* :—"In India orientale."
Other localities :—Travancore; "Madras" (Jerdon) (B. M.); Western Ghats; Dharwar; Kanara; Bellary; Mysore; Coorg (M. S. I.).
Type :—Unknown.
10. *M. pileata*, Shaw. *Type locality* :—Ceylon.

Other localities :—Habbertota, Ceylon (B. M.), North and North-east Provinces, Ceylon (M. S. I.).

Type :—Unknown.

11. *M. fascicularis*, Raffles. Type locality :—Sumatra (Raffles).

Other localities :—Malay Peninsula (B. M.); Tenasserim (M. S. I.).

Type :—Unknown.

Thomas has recently pointed out (A. M. N. H. (8), xvii, p. 179, 1916), that this name was based by Geoffroy and Cuvier (1795) on a Ceylon monkey which, whatever its species, was a langur and not a macaque, hence it is the oldest name for the langurs, and must be used in place of SEMNOPITHECUS, adopted by Blanford (Mamm., p. 25).

These four species form the first section of Blanford's key. But in addition to these Dollman proposes to revive the name *anchises*, Blyth, for the southern race of *entellus*. (J. B. N. H. S., xxii., p. 442, 1913), Elliot has established the name *lanius* for the race of *schistaceus* living on the northern slope of the Himalayas. Finally I have recently described a langur from the Northern Shan States under the name of *shanicus* (J. B. N. H. S., xxv, p. 46, 1917). This, however, had already received a name, by which it must be known, from Elliot, *viz.*, *melamerus* (Rev. Prim., iii, p. 47, 1913).

True *femoralis* was named but not described by Horsfield (Mem. Sir T. S. Raffles, App. p. 462, 1830), who gave the type locality as "in Sumatra et Java." The specimen however was fully described by Martin in 1833 (Charl. Mag. N. H., ii, p. 436) under the same name. Robinson and Kloss separated the Tenasserim form as a subspecies of *neglecta* (*i. e.* of *femoralis*), (Jour. F. M. States, Mus. IV, p. 174, 1911), distinguishing it under the name *keatii*, "by its generally brown coloration, absence of white on the chest, and by having the white femoral line produced quite to the heel (J. B. N. H. S., xxiii, p. 702, 1915).

These species form a third section (*viz.*: C. a.) of Blanford's key. Zimmermann spelt his species name *kephalopterus* and this spelling must be accepted. The name *senex* appears to be undoubtedly a synonym of *veter*, L. Both, as well as *albinus*, Kel., seem to

No. 16. *johni*, Fisch.

No. 17. *cephalopterus*, Zimm.

No. 18. *senex*, Erxl.

No. 19. *ursinus*, Bly.

No. 22. *barbei*, Bly.

represent an albino of some form of Ceylon monkey, probably either *kephalopterus* or *ursinus*. Still as this is also the genotype of PITHECUS (Thomas, A. M. N. H., xvii, p. 179, 1916), I propose to retain it for the present among the species in my key. Blyth in his original description of *barbei* (J. A. S. B., xvi, p. 734, 1847) gave the type locality as the Ye Province of Tenasserim, but in 1863 (Cat. Mamm. Mus. As. Soc., p. 48) he corrected this, on the authority of the collector, M. Barbe, to "interior of Tipperah Hills". After careful consideration I decided (J. B. N. H. S., xxv, p. 46, 1917) to adopt, at any rate provisionally, the Tenasserim monkey as the representative of *barbei*.

This species forms a fourth section of Blanford's key, *viz.*, C. b., where it represents the Assam langurs. No. 20. *pileatus*, Bly. In 1916 (J. B. N. H. S., xxiv, p. 654), I stated that the name *pileatus* was inadmissible for a langur; I fear I was mistaken. As now advised, I must withdraw that statement and consequently my name *durga* must fall, as a synonym of *pileatus*, Bly. I may note here that I have been successful in tracing the type of *argentatus*, Horsf. (Cat. Mamm. E. I. C. Mus., p. 7, 1851), ranked by Blanford as a synonym of *phayrei*, and it too proves to be *pileatus*, Bly. At the same time that I described *durga*, I proposed the name *brahma* for the langur of Upper Assam. Finally, in dealing with the Chindwin Collection I had already described *shortridgei* (J. B. N. H. S., xxiv, p. 56, 1915), but the subspecies *belliger*, then proposed, cannot stand, for Mr. Shortridge assigns its difference in colour from *shortridgei*, its chief characteristic, to an effect of wood smoke while drying the skins of the specimens. Thus the following must be substituted for *pileatus* in Blanford's list, *viz.*, *pileatus*, Bly., Lower Assam; *brahma*, Wr., Upper Assam; and *shortridgei*, Wr., Upper Chindwin.

These two species represent section C. c. of Blanford's key, *i.e.*, the crested langurs. The second is

No. 23. *phayrei*, Bl.

No. 24. *obscurus*, Reid.

represented in our area by *crepusculus*, Elliot.

This name, which forms the concluding section of Blanford's key,

No. 21. *chrysoyaster*, Bonap.

was first used as a synonym of *potenziani*, (J. B. N. H. S., xxiv, p. 653), and consequently must be

allowed to drop altogether. The langurs as thus altered may be arranged in a key as follows:—

Key to the species of PITHECUS.

- I. Hair of crown radiating from one or more points on the forehead.
 - 1.—Hair of crown radiating from a central point on forehead.

- a. Limbs and tail black 1. *hypoleucos*, Bly.
 - b. Limbs and tail not (or little) darker than the body.
 - a¹. Hands and feet same colour as the limbs.
 - a². Crown of head scarcely paler than body 2. *prium*, Bly.
 - b². Crown of head white.
 - a. Hair silky 3. *schistaceus*, Hodgs.
 - b. Hair woolly 4. *s. lanius*, Ell.
 - b¹. Hands and feet black.
 - a². Small (condylo-basal length of skull 75-85 mm.) Pattern practically unicolorous 5. *melamerus*, Ell.
 - b². Larger. Pattern mixed dark and light.
 - a³. Large (condylo-basal length of skull 95-105 mm.). Tail only occasionally with a long white tip 6. *entellus*, Dufur.
 - b³. Smaller (condylo-basal length of skull 90-95 mm); tail most usually with a long white tip 7. *e. anchises*, Bly.
- B.—Hair of crown radiating from two frontal points, one on each side of the head [Kl. 8. *f. keatii*, Rob. &
11. Hair of crown directed backwards throughout, not radiating.
- A.—No crest.
- a. Hair of crown not longer than that on temples and nape.
 - a¹. Body black or dusky brown above and below.
 - a². Head black throughout like body. 9. *barbei*, Bly.
 - b². Head pale brown.
 - a³. Cheeks the same colour as crown 10. *johni*, Fisch.
 - b³. Cheeks paler than crown.
 - a⁴. Sacral region grey ... 11. *kephalopterus*, Zimm.
 - b⁴. Sacral region black ... 12. *ursinus*, Bly.
 - b¹. Body yellowish white throughout... 13. *veter*, L.
 - b. Hair of crown longer than that of temples and occiput, forming a "cap".

- a*¹. General colour cinereous.
- a*². Whiskers only slightly paler than the general body colour; under surface coloured like the back 14. *shortridgei*, Wr.
- b*². Whiskers pure white; under surface greyish on the chest, buff on the abdomen... .. 15. *brahma*, Wr.
- b*¹. General colour dusky brown; whiskers and under surface ochraceous 16. *paleatus*, Bly.
- B.— A crest of longer hairs.
- a*. A pointed crest on occiput; adults ash to blackish brown 17. *crepusculus*. Elliot.
- b*. Crest compressed and longitudinal on crown of head.
- a*¹. Body dark grey above, whitish below... .. 18. *phayrei*, Bly.
- b*¹. Body white above, grey below ... 19. *robinsoni*, Thos.

DISTRIBUTION :—

1. *P. leypoleucos*, Blyth. *Type locality* :—Travancore (Dr. Coles).
Other localities :—South Coorg (M.S.I.).
Type :—Ind. Mus. Calc. No. 13a.
2. *P. priam*, Blyth. *Type locality* :—Coromandel Coast (Elliot).
Other localities :—Travancore (B. M.); Ceylon (M. S. I.).
Type :—Ind. Mus. No. 12a.
3. *P. schistaceus*, Hodgson. *Type locality* :—Nepal (Hodgson).
Other localities :—Nepal; Sik-
kim; Kashmir (B. M.);
Kumaon (M. S. I.)
Co-types :—B. M. No. 43.1.12.
1-3.
Lectotype :—B. M. No. 43.1.
12.1.
4. *P. schistaceus lanius*, Elliot. *Type locality* :—Chumbi, Thi-
bet (B. N. H. S.—F. M. Bailey).
Other localities :—None.
Type :—B. M. No. 9.7.16.1.

5. *P. melamerus*, Elliot. *Type locality* :—Bhamo (Fea).
 Other localities :—N. Shan
 States (M. S. I.)
 Type :—B. M. No. 88.12.1.64.
 (Type of *shanicus*, Wroughton,
 B. M. No. 14.7.8.5).
6. *P. entellus*, Dufresne. *Type locality* :—“Bengal.”
 Other localities :—“Bombay”
 (Sykes); Central Provinces (B.
 M.); Kathiawar; Nimar; Berar;
 Central Provinces; Behar; Orissa
 (M. S. I.)
 Type :—Unknown.
7. *P. entellus anchises*, Blyth. *Type locality* :—“Deccan, and
 along the foot of the Western
 Ghats”. (Elliot).
 Other localities :—Dharwar; Ka-
 nara; Bellary (M. S. I.)
 Type :—Lost (?). Not in Cat.
 Ind. Mus. Calc. (1881); (Blyth’s
 Cat. Mamm. Mus. As. Soc.,
 1863, No. 27 j.)
8. *P. femoralis keatii*, Robin- *Type locality* :—Traung, S. W.
 son & Kloss. Siam (Robinson).
 Other localities :—S. Tenasserim
 (B. M.); S. Tenasserim (M.
 S. I.)
 Type :—Selangor Mus. No.
 1231/10.
9. *P. barbei*, Blyth. *Type locality* :—1st. Ye Pro-
 vince, Tenasserim; 2nd. Interior
 of Tippera Hills. (See above).
 (Rev. J. Barbe).
 Other localities :—N. Tenas-
 serim (B.M.)
 Type :—Ind. Mus. Calc. No.
 19a.
10. *P. johni*, Fischer. *Type locality* :—Tellicheri, Ma-
 labar.
 Other localities :—Nilgiri Hills;
 Coorg (Blanford) (B. M.); S.
 Coorg (M.S.I.).
 Type :—Unknown.
11. *P. cephalopterus*, Zimmer- *Type locality* :—“East Indies.”
 mani. *Other localities* :—“Raygun
 Corola” (Colombo Museum);

- Adam's Peak (B. M.) Kottawa, Ceylon (M. S. I.).
Type:—Unknown. (Type of *thersites*, Blyth, Ind. Mus. Calc. No. 12c. Type of *albinus*, Kelaart, Ind. Mus. Calc. No. 15s.)
12. *P. ursinus*, Blyth. *Type locality*:—Newara Eliya, Ceylon (Kelaart).
Other localities:—Pattipola and Hakgalla, Ceylon (M. S. I.)
Type:—Ind. Mus. Calc. No. 15p.
13. *P. vetei*, Linnæus. *Type locality*:—"In Zeylona".
Other localities:—None.
Type:—Unknown.
14. *P. shortridgei*, Wroughton. *Type locality*:—Homalin, Upper Chindwin River. (B. N. H. S.—Shortridge).
Other localities:—Homalin and Hkamti (under the name *belliger*), Upper Chindwin (M. S. I.)
Type:—B. M. No. 15.5.5.10 (Type of *s. belliger*, Wroughton B. M. No. 15.5.5.14.).
15. *P. brahma*, Wroughton. *Type locality*:—Lakhimpur, Upper Assam (H. Stevens).
Other localities:—None.
Type:—B. M. No. 13.2.21.1.
16. *P. pileatus*, Blyth. *Type locality*:—Unknown (menagerie specimen).
Other localities:—Silhet; Assam (B.M.).
Type:—Ind. Mus. Calc. No. 14 d. (Type of *argentatus*, Horsfield, B. M. No. 79.11.21.597; Type of *durga*, Wroughton, B. M. No. 86.10.18.1.)
17. *P. crepusculus*, Elliot. *Type locality*:—Mt. Muleyit, Tenasserim (Hume-Davison).
Other localities:—Mt. Muleyit, (M. S. I.)
Type:—B. M. No. 85.8.1.11.
18. *P. phayrei*, Blyth. *Type locality*:—Arakan (Col. Phayre).
Other localities:—Siam (?) (B. M.); Kin, Lower Chindwin;

Ngapyinium, Upper Irrawady; Mt. Popa; Pegu (M. S. I.).

Type:—Ind. Mus. Calc. No. 20 a.

Type of *crepuscula*, Elliot. B. M. No. 85.8.1.11).

19. *P. robinsoni*, Thomas.

Type locality:—Trang, S. W. Siam (Robinson).

Other localities:—None.

Type:—B. M. No. 10.10.1.1.

Suborder II.—LEMUROIDEA.

There is only one family, *viz.*, the LEMURIDÆ.

Family.—LEMURIDÆ.

There are two genera distinguished by Blanford as follows:—

Key to the genera of the LEMURIDÆ.

- A.—Either only two incisors, or four of unequal size, the inner pair much larger than the outer; tail present, but very short; limbs not remarkably slender ... I. NYCTICEBUS.
- B.—Four small upper incisors, of equal size; tail none; limbs very slender ... II. LORIS.

Gen. I.—NYCTICEBUS.

This name belongs by right to the Slender Loris of Ceylon (Thomas, A.M.N.H., p. 468, 1908:

No. 25, *tardigradus*, L. and P.Z.S., p.129, 1911). The next oldest name is *coucang*, based by

Boddaert on the "tailless Macauco" of Pennant (Elench. Anim. i, p. 67, 1785). Pennant's actual description of the animal, a specimen in the Leverian Museum, is unmistakably that of a NYCTICEBUS, although in his other remarks he seems to confuse NYCTICEBUS and LORIS. No specimen, so far as I know, has ever again been obtained from the type locality, *i.e.*, Bengal (J.B.N.H.S., xxiv., p. 702, 1915).

DISTRIBUTION:—

N. coucang, Boddaert.

Type locality:—"Bengal."

Other localities:—Lower Pegu (B.M.); Chindwin; Pegu; Tenasserim (M.S.I.).

Type:—Unknown.

Gen. II.—LORIS.

Miss Ryley has pointed out how the name *gracilis* came to be substituted for the original *tardigradus*

No. 27, *gracilis*, Geoff.

(J. B. N. H. S., xxii., p. 285, 1913).

This latter name being the older

must be used for the Ceylon Loris. Lydekker, in 1904 (P. Z. S., p. 345), separated the Madras from the Ceylon form, but put the name *gracilis* on the Madras animal, making the Ceylon form a subspecies, under the name *zeylanicus*. Thomas having in the meanwhile (A. M. N. H., i., p. 468, 1908) shown that the Ceylon animal must be called *tardigradus*, Cabrera pointed out that the Madras form was now without a name and suggested for it that of *lydekkerianus*. (Bol. R. S. Espan. Hist. Nat., p. 211, 1908). While going through all the available material for the preparation of this Summary, I found that the Ceylon specimens, though they approached those of *lydekkerianus* from Mysore, were markedly larger and otherwise differed from animals from Malabar, I therefore concluded to separate these latter under the name *malabaricus* (J. B. N. H. S., xxv., p. 45, 1917). These three species, which are all included in the name *gracilis* of Blanford, may be arranged in a key as follows:—

Key to the species of LORIS.

- A.—Size large (head and body, 245 mm.; greatest length of skull 52 mm.); ears large.
- a. General colour grey; a median dorsal stripe
1. *lydekkerianus*, Cabr.
- b. General colour brownish grey; no dorsal stripe
2. *tardigradus*, L.
- B.—Size small (head and body 220 mm.; greatest length of skull 45 mm.); ears small...
3. *malabaricus*, Wr.

DISTRIBUTION.

1. *L. lydekkerianus*, Cabrera. *Type locality*:—"Madras."
Other localities:—Kolar District, East Mysore (M.S.I.).
Co-types:—B. M. No. 3.2.19.1. and 2.
Lectotype:—B.M. No.3.2.19.1.
2. *L. tardigradus*, Linnaeus. *Type locality*:—"Ceylon."
Other localities:—Ceylon (M. S.I.).
Type:—Unknown. (Type of *Zeylanicus*, Lydekker, B. M. No. 4.10.12.3.).
3. *L. malabaricus*, Wroughton. *Type locality*:—Kutta, S. Coorg (B.N.H.S.—Shortridge).
Other localities:—Travancore (B.M.); S. Coorg (M.S.I.).
Type:—B. M. No. 13.8.22.3.

Order II.—CHIROPTERA.

Such great strides have been made in the classification of the bats since Blanford published his "Mammalia," that I have found it necessary to go into the currently accepted distribution, not only as it affects the genera, but the Families and Subfamilies. The most recent works are Miller's "Families and Genera of Bats," 1908, and K. Andersen's "Catalogue of the Chiroptera," Vol. I. (Fruit Bats), 1912. Both these, it will be seen, were published before Survey specimens were available. I have followed as closely as possible the two works quoted above, so far as they deal with the Indian fauna, *viz.*, Miller for the general classification and Andersen for the MEGACHIROPTERA. The Families may be arranged in a key as follows:—

Key to the Families of the CHIROPTERA.

- A.—Neither nose-leaf nor tragus present ... I. PTEROPODIDÆ.
 B.—Either nose-leaf or tragus, or both, present.
 a. Both nose-leaf and tragus present.
 a'. Face not grooved; nose-leaf large, up-standing ... [MATIDÆ.
 ... III. MEGADER-
 b'. Face grooved; nose-leaf small, folded down ... IV. NYCTERIDÆ.
 b. Either a nose-leaf or a tragus present, but not both.
 a'. A nose-leaf but no tragus present ... II. RHINOLOPHIDÆ.
 b'. No nose-leaf but a tragus present.
 a². Tail entirely enclosed in interfemoral membrane ... [IDÆ.
 ... V. VESPERTILION-
 b². A portion of the tail free.
 a³. Tail emerging from the upper surface of the interfemoral membrane comparatively short and stout ... [RIDÆ.
 ... VI. EMBALLONU-
 b³. Tail emerging from the end of the interfemoral membrane.
 a⁴. Tail very long and slender ... VII. RHINOPOMIDÆ.
 b⁴. Tail comparatively short and stout ... VIII. MOLOSSIDÆ.

Family I.—PTEROPODIDÆ.

The six Genera of the Family may be arranged in a key as follows:—

Key to the Genera of the PTEROPODIDÆ.

1. Tongue moderate; inner margin of the nostril projecting.

- A.—Upper part of one colour throughout.
- a.* Five teeth in upper molar series,
six in lower I. ROUSETTUS.
- b.* Four teeth in upper molar series,
five in lower.
- a'.* Calcar present III. CYNOPTERUS.
- b'.* Calcar absent IV. SPHÆRIAS.
- B.—Hind neck and shoulders generally
paler than back II. PTEROPUS.
- II. Tongue very long; no projecting margin
to nostril.
- a.* No claw to index; wing from base
of first toe; tail distinct ... V. EONYCTERIS.
- b.* A claw to index; wing from
base of fourth toe; tail rudimentary
... .. VI. MACROGLOSSUS.

Gen. I.—ROUSETTUS.

Blanford uses XANTHARPYIA, established by Gray in 1843 (List Spec. Mamm. B. M., xix, p. 37) but that author had already used ROUSETTUS in 1821 (Lond. Med. Repos., xv, p. 299) which therefore as the older name must be used for the genus.

No. 137. *amplexicaudatus*, Geoff. Blanford uses this single name to cover all the Indian forms of the genus.

K. Andersen however recognises three species which may be arranged in a key as follows:—

Key to the species of ROUSETTUS.

- A.—Pollex 30-37.5 mm; second phalanx of
third digit 50.5-61.5 mm. 1. *arabicus*, And.
de Wint.
- B.—Pollex 24-30 mm.; second phalanx of
third digit 36-47.2 mm.
- a.* Fur on nape and shoulders not unusually
sparse; forearm 80.5-87.5 2. *leschenaulti*,
Desm.
- b.* Nape, and shoulders semi-naked; forearm
79-85.5 mm. 3. *seminudus*, Kel.

DISTRIBUTION:—

1. *R. arabicus*, Anderson & de Winton. *Type locality*:—Lahej, Aden (Col. Yerbury).

Other localities:—Muscat, Oman; Karachi, Sind (B. M.). Not obtained by Survey.

Type:—B. M. No. 95. 6.1. 47.

2. *R. leschenaulti*, Desmarest. *Type locality*:—Pondichery. (Leschenault).

Other localities:—Nepal; Nasirabad, Rajputana (Boys); Myingan, Burma (B. M.); Western Ghats, Bombay; Coorg; Kumaon; Bhutan Duars; Mt. Popa; Upper Burma; Tenasserim (M. S. I.).

Co-types:—Paris Museum (Type of *Cynopterus affinis*, Gray. B. M. No. 38.3.13.37. Type of *Pteropus pyrivorus*, Hodgs. B. M. No. "not registered." Type of *Eleutherura fuliginosa*, Gray. B. M. No. 62.8.18.5. Type of *Eleutherura fusca*, Gray. B. M. No. 49.8.23.10.).

3. *R. seminudus*, Kelaart.

Type locality:—Mt. Lavinia, Ceylon (Kelaart).

Other localities:—Punduloya, Ceylon (B. M.); Hambantota, Urugala, and Kandy, Ceylon (M. S. I.).

Type:—Ind. Mus. Calc. No. 94 b.

Gen. II.—PTEROPUS.

The specific names in this genus have been so confusingly intermixed that it would be a waste of time to try and fix the exact equivalents of Blanford's three species. K. Andersen adopts the name *giganteus*, Brünnich, for the common Flying Fox of India, with a doubtful subspecies, *leucocephalus*, Hodgs., from the high hills above Nepal. Besides this he recognises the following forms as occurring or likely to occur within our area, viz., *hypomelanus*, *intermedius*, and *melanotus*. These may be arranged in a key as follows:—

Key to the species of PTEROPUS.

- A.—Posterior basal ledges of large premolars distinct.
 - a. Interfemoral scarcely developed in centre; forearm 134-137 mm. ... 1. *hyp. geminorum*, Mill.
 - b. Interfemoral distinct in centre; forearm 153-165 mm. ... 2. *melanotus*, Blyth.
- B.—Posterior basal ledges of premolars practically obliterated.
 - a. Underside of body paler than back; forearm 163-177.

- a*. Fur shorter, 8-12 mm. on
back 3. *gig. giganteus*, Brünn.
- b*. Fur longer, 15-18 mm. on
back 4. *gig. leucocephalus*,
Hodgs.
- b*. Underside of body quite or nearly
as dark as back; forearm about
180 mm. 5. *intermedius*, K. And.

DISTRIBUTION :—

1. *P. hypomelanus geminorum*,
Miller.

Type locality:—South
Twin Island, Mergui Archi-
pelago (Dr. W. L. Abbott).

Other localities:—S. Twin
Island (B. M.).

Type:—U. S. Mus. No.
104464.

2. *P. melanotus*, Blyth.

Type locality:—Nicobar
Islands. (Capt. Lewis).

Other localities:—Nico-
bars (Hume) (B. M.).

Type:—Ind. Mus. Calc.
No. 92b.

3. *P. giganteus giganteus*, Brünnich. *Type locality*:—Bengal.
(Unknown).

Other localities:—Saugor,
Central Provinces; Nee-
muh, Rajputana; Dharwar
(Elliot); Travancore;
Ceylon (B. M.); Cutch;
Kathiawar; Palanpur; Ni-
mar; Berars; Central Pro-
vinces; Koyna Valley;
Dharwar; Bellary; South
Mysore; Ceylon; Kumaon;
Bengal; Sikkim; Bhutan
Duars; Pegu (M. S. I.).

Type:—Copenhagen
Museum.

4. *P. giganteus leucocephalus*,
Hodgson.

Type locality:—Nepal
(Hodgson).

Other localities:—Nepal;
Assam; Manipur (B. M.).
Not obtained by Survey.

Co-types:—B. M. Nos.
45.1.8.273-275; 45.5.15.4.

Lectotype:—B. M. No. 45.1.8.273.

5. *P. intermedius*, K. Andersen.

Type locality:—Amherst, Burma (Hume-Davison).

Other localities:—None.

Type:—B. M. No. 85.8.1.101.

Gen. III.—CYNOPTERUS.

Miller has separated *blanfordi*, Thos., as a distinct genus. Andersen adopts *sphinxæ*, Vahl, as being an older name than *marginatus* and declines to accept true *brachyotis*, Müll., as occurring within our limits, but substitutes for it the subspecies *angulatus*, Mill. The change required in the key may be made as follows:—

Key to the species of CYNOPTERUS.

A.—Ears relatively longer, 18-20.5 mm.

- a. Smaller, forearm 66-73.5 mm. ... 1. *sph. sphinxæ*, Vahl.
 b. Larger, forearm 73-78 mm.. ... 2. *sph. gangeticus*, K. And.

B.—Ears relatively shorter, 13-18 mm.

- a. Larger, forearm 65-72 mm. ... 3. *brach. angulatus*, Mill.

b. Smaller, forearm 54.5-70 mm.

- a¹. Ears relatively larger, 15-17 mm. ... 4. *brach. ceylonensis*, Gray.

b¹. Ears relatively shorter, 13-15 mm.

- a². Smaller, forearm 59-66 mm. ... 5. *brach. brachysoma*, Dobs.

- b². Larger, forearm 69.5-70 mm. ... 6. *brach. scherzeri*, Zeleb.

DISTRIBUTION:—

1. *C. sphinxæ sphinxæ*, Vahl.

Type locality:—Tranquebar, Madras.

Other localities:—Bombay; Dharwar; Madras (Jerdon); Travancore (B. M.); Kanara; Mysore; Coorg; Ceylon; Bengal;

Kumaon; Sikkim; Darjiling; Bhutan Duars; Chin Hills; Chindwin; Shan States (M. S. I.).

Type:—Unknown (Co-types of *C. ellioti*, Gray, B. M. Nos. 40 k & l. Lectotype, B. M. No. 40k).

2. *C. sphinx gangeticus*, K. Andersen. *Type locality*:—Lucknow. (B. N. H. S.—Maj. Begbie).

Other localities:—Palampur; Nimar; Central Provinces (M. S. I.).

Type:—B. M. No. 10. 11.14.1.

3. *C. brachyotis angulatus*, Miller.

Type locality:—Trang, Lower Siam. (Dr. W. L. Abbott).

Other localities:—Chindwin (B.M.); Tenasserim (M.S.I.).

Type:—U. S. Nat. Mus. No. 83569. (in a1).

4. *C. brachyotis ceylonensis*, Gray.

Type locality:—Ceylon (Thwaites).

Other localities:—Punduloya, Ceylon (B. M). Not obtained by the Survey.

Co-types:—B. M. Nos. 52.2. 19.1. & 58.10.19.12.

Lectotype:—B. M. No. 58.10. 19.12.

5. *C. brachyotis brachysoma*.
Dobson.

Type locality:—South Andaman Island (Col. Tytler).

Other localities:—None.

Type:—Ind. Mus. Calc. No. 99/a. (Co-types of *C. marginatus andamanensis*, Dob. B.M. Nos. 9.4.4.1. & 2.)

6. *C. brachyotis scherzeri*, Zelebor.

Type locality:—Car Nicobar.

Other localities:—None.

Co-types:—Presumably in Vienna Museum.

Gen. IV.—SPHÆRIAS.

- No. 142. *blanfordi*, Thos. Miller separated this genus from CYNOPTERUS in 1906 (Proc. Biol. Soc. Wash., XIX., p. 83).

DISTRIBUTION :—

S. blanfordi, Thomas. *Type locality*:—Karin Hills, Burma. (Fea).

Other localities:—The original three specimens collected by Fea are the only ones known.

Co-types:—B. M. No. 90.4.7.6. and specimen in Genoa Museum.

Gen. V.—EONYCTERIS.

- No. 144. *spelæa*, Dobs. No change required.

DISTRIBUTION :—

E. spekeæ, Dobson. *Type locality*:—Farm Caves, Moulmein. (Theobald).

Other localities:—Nan, Siam; Malay Peninsula (B. M). Tenasserim (M. S. I.).

Type:—Ind. Mus. Calc. No. 100 a.

Gen. VI.—MACROGLOSSUS.

Blanford used the name CARPONYCTERIS, holding that MACROGLOSSUS was antedated by MACROGLOSSA, Ochs. 1816, but this view is not generally accepted, the terminal difference being held to be sufficient in the case of a generic name.

Dr. Andersen restricts true *minimus* to the Java form and establishes a subspecies *sobrinus*

- No. 143. *minimus*, Geoff. for the Malay Peninsula and northwards.

DISTRIBUTION :—

M. minimus sobrinus, K., Andersen. *Type locality*:—Gunong Ikari, Perak (A. L. Butler).

Other localities:—Tenasserim (M. S. I.).

Type:—B. M. No. 98.11. 29.1.

NOTE:—In preparing this summary of the PTEROPODIDÆ, I have relied entirely on Vol. 1 of Dr. Andersen's "Catalogue of the Chiroptera" (1912), the latest authoritative work on the subject. It was published before the Survey was at work, but so far as I can judge, extremely little or no change (certainly no important

change) would have been necessitated, had it been otherwise, beyond some additions to the distribution details, which are here furnished. The comparison and study for Vol. 2 have been practically completed by Dr. Andersen, and I have his assurance that for the Indian portion of his work, the Survey material has been of invaluable assistance. Unfortunately the formulation and publication of his results have been unavoidably postponed, and they are not available to me in preparing this summary. Dr. Andersen however published in 1905 several papers on the RHINOLOPHIDÆ on which I have relied.

Family II.—RHINOLOPHIDÆ.

Three Genera are represented which may be distinguished as follows:—

Key to the genera of the RHINOLOPHIDÆ.

- A.—First toe with only two joints; a distinct antitragus separated by a notch from the outer margin of the ear... .. I. RHINOLOPHUS.
- B.—All toes with only two joints; no notch separating the antitragus from the outer margin of the ear
- a. Anterior nose-leaf on horseshoe not divided in the middle II. HIPPOSIDEROS.
- b. Anterior nose-leaf divided into distinct lappets III. COELOPS.

Gen. I.—RHINOLOPHUS.

In 1905, Dr. Andersen published a paper (A. M. N. H. 7., xvi. p. 648), in which he divided this genus into a number of groups, and I think the most satisfactory arrangement will be to take them one at a time. They may be arranged in a key as follows:—

Key to the groups of RHINOLOPHUS.

- A.—Connecting process absent VI. *arcuatus* Group.
- B.—Connecting process present.
- a. Sella trifoliate IV. *philippensis* Group.
- b. Sella not trifoliate.
- a¹. Connecting process starting below top of sella V. *macrotis* Group.
- b¹. Connecting process starting at top of sella.
- a². Connecting process high and prominent II. *lepidus* Group.
- b². Connecting process low.

2. *R. affinis himalayanus*, K. Andersen.
Type locality:—Mussoorie, United Provinces (Hutton).
Other localities:—Mussoorie; Nepal; Darjiling (B. M.). Bhutan Duars; Chindwin (M. S. I.)
Type:—B. M. No. 79. 11.21. 148. (in al.)
3. *R. affinis tener*, K. Andersen.
Type locality:—Pegu, Burma (W. Theobald).
Other localities:—None.
Type:—B. M. No. 87.3. 4.11. (in al.)
4. *R. andamanensis*, Dobson.
Type locality:—South Andaman Island. (J. Homfray).
Other localities:—None.
Type:—Indian Mus. Calc. No. 110a.
5. *R. rouxi*, Temminck.
Type locality:—Pondichéri and Calcutta. (? Roux).
Other localities:—Nepal; Darjiling; Kanara; Nilgiri Hills; Ceylon (B. M.); Dharwar; Kanara; Ceylon (M. S. I.)
Type:—Leyden Museum.
6. *R. thomasi*, K. Andersen.
Type locality:—Karin Hills, Burma (Fea).
Other localities:—None.
Type:—B. M. No. 90.4.7. 10. (in al.)
7. *R. ferrum-equinum traqatus*, Hodgson.
Type locality:—Nepal (Hodgson).
Other localities:—Darjiling (B.M.); Sikkim (M. S. I.)
Co-types:—B. M. Nos. 43.1.12.135-137.
Lectotype:—B. M. No. 43.1.12.135.
8. *R. ferrum-equinum regulus*, K. Andersen.
Type locality:—Mussoori, U. Provinces (Hutton).
Other localities:—Kumaon (B. M.)

- Type :—B. M. No. 79.11.
21.153. (in al.)
9. *R. ferrum-equinum proximus*,
K. Andersen. Type locality :—Gilgit.
(Scully.)
Other localities :—None.
Type :—B. M. No. 81.3.1.
10. (in al.)

II. *lepidus* Group.

- No. 154. *minor*, Horsf. Following Andersen, four forms are included in this group, and these may be arranged in a key as follows :—

Key to the species of the R. lepidus Group.

- A.—Size large, forearm 37.5-42 mm.
a. Larger ; nasal swelling broader ;
metacarpals longer 1. *lepidus*, Bly.
b. Smaller ; nasal swellings narrower ;
metacarpals shorter 2. *monticola*, K. And.
B.—Size smaller, forearm 34.2-36 mm.
a. Sella parallel-margined 3. *gracilis*, K. And.
b. Sella tapering 4. *subbadius*, Bly.

DISTRIBUTION :—

1. *R. lepidus*, Blyth. Type locality :—“Calcutta?”
Other localities :—Wynaad ;
Ganges Valley (B. M.) ;
Central Provinces ; Koyna
Valley ; Kanara ; Kumaon ;
Bengal ; Mt. Popa (M.S.I.)
Type :—Unknown.
2. *R. monticola*, K. Andersen. Type locality :—Mussoorie,
United Provinces (Hutton).
Other localities :—Kumaon ;
Chindwin (M. S. I.)
Type :—B. M. No. 79.11.
21.151. (in al.)
3. *R. gracilis*, K. Andersen. Type locality :—Malabar
Coast.
Other localities :—None.
Type :—B. M. No. 73.4.
16.2. (in al.)
4. *R. subbadius*, Blyth. Type locality :—Nepal
(Hodgson).
Other localities :—Mussoorie,
United Provinces ; Garo Hills
Assam (B. M.)

Type:—Ind. Mus. Calc.
(No. ?) (Type of *garoensis*
Dobson, Ind. Mus. Calc. No.
113a).

III. *midas* Group.

No. 155. *hipposiderus*, Bechs. The only representative of
the group.

DISTRIBUTION:—

R. hipposiderus, Bechstein. *Type locality*:—Caspian Sea.
Other localities:—Gilgit (B. M.)
Type:—Unknown.

IV. *philippinensis* Group.

No. 145. *luctus*, Temm. To these two species Andersen
No. 147. *trifoliatus*, Temm. adds two more, the whole may be
arranged in a key as follows:—

Key to the species of the R. philippinensis Group.

- A.—Size large, forearm 71.5-78 mm ... 1. *perniger*, Hodgs.
B.—Size smaller.
a. Size larger, forearm 63-68 mm.
a¹. Third metacarpal (45.5-50 mm),
and tail (50-55.2 mm) longer ... 2. *luctus*, Temm.
b¹. Third metacarpal (37.5 mm), and
tail (35mm) short ... 3. *beddomei*, K. And.
b. Size smaller, forearm 45-56 mm. ... 4. *trifoliatus*, Temm.

DISTRIBUTION:—

1. *R. perniger*, Hodgson. *Type locality*:—Nepal (Hodgson).
Other localities:—Mussoorie, United
Provinces; Nepal; Sikkim (B. M.);
Chin Hills; Shan States (M. S. I.)
Type:—B. M. No. 79.11.21.55.
2. *R. luctus*, Temminck. *Type locality*:—Tapos, Java (Boie).
Other localities:—Malay Peninsula
(B. M.); Tenasserim (M. S. I.).
Type:—Leyden Museum (Type of
morio, Gray, B. M. No. 40.5.17.36).
3. *R. beddomei*, K. Ander-
sen. *Type locality*:—Wynaad, Madras
(Beddome).
Other localities:—Kanara; Coorg ;
Ceylon (M. S. I.).
Type:—B. M. No. 82.3.3.1. (in al.)

4. *R. trifoliatus*, Temminck.

Type locality:—Bantam, Java (Hasselt).

Type localities:—Malay Peninsula; S. W. Siam; Tenasserim (B. M.); Darjiling; Tenasserim (M. S. I.)

Type:—Leyden Museum.

V. *macrotis* Group.

These two representatives of the group may be distinguished as follows:—

Key to the species of the macrotis Group.

- A.—Third metacarpal shortened (656 mm)... 1. *pearsoni*, Horsf.
 B.—Third metacarpal longer (703 mm) ... 2. *macrotis*, Hodgs.

DISTRIBUTION:—

1. *R. pearsoni*, Horsfield.

Type locality:—Darjiling (Pearson).

Other localities:—Kumaon; Darjiling (M. S. I.).

Type:—B. M. No. 79.11.21.56.

2. *R. macrotis*, Hodgson.

Type locality:—Nepal (Hodgson).

Other localities:—Mussoorie, United Provinces, Nepal (B. M.).

Type:—B. M. No. 45.1.8.416.

VI. *arcuatus* Group.

No. 146. *cælophyllus*, Pet.

This is the solitary representative of the Group within our limits.

DISTRIBUTION:—

R. cælophyllus, Peters.

Type locality:—Salween River, Burma (Capt. Beavan).

Other localities:—Malay Peninsula; Moulmein, Lower Burma; Tsagine, Upper Burma (B. M.).

Type:—Berlin Museum.

NOTE:—With reference to Blanford's No. 148, *mitratus*, Blyth. Dr. Andersen informs me that he has examined the co-types (Ind. Mus. Calc. Nos. 105 a. and b.), which were taken by Tickell at Chaibassa, Orissa, in 1843, and they are in such bad condition that it is impossible to discover with any certainty even the affinities of the species. The animal has never again been taken. Under the circumstances I have omitted *mitratus* altogether from the above review of the genus.

Gen. II.—HIPPOSIDEROS.

These two species form the first section of Blanford's key to the genus, but *diadema* does not occur in our area, on the other hand, Andersen has revived *lankadiva*, Kelaart, to contain the bats included in *diadema* by Blanford, and Thomas has established a species for a bat from S. W. Siam, which proves to occur within our limits, and finally Andersen has provided a subspecific name *debilis* (A. M. N. H. 7, xvii, p. 37, 1906), for the southern race of *armiger*.

These eight species make up the rest of Blanford's key. In my reports I used *fulvus*, Gray, and *dukhunensis*, Sykes, for *bicolor* and *speoris* respectively (J. B. N. H. S., xxi, pp. 1178 and 1179, 1912), I am now advised that *fulvus* should be retained but that there is not sufficient reason to substitute *dukhunensis* for *speoris*. The species *galeritus*

does not seem to occur within our limits and therefore the name *brachyotus*, Dobson, should be substituted for it. Finally true *tridens* does not come into our area, where it is represented by a subspecies *tridens murriana*, K. Andersen. The species as thus modified may be arranged in a key as follows:—

Key to the species of HIPPOSIDEROS.

- A.—Size large, forearm 78-97mm.
- a. A large frontal glandular sac; posterior leaf narrower than horseshoe.
 - a'. Size larger, forearm 84 mm. and upwards... .. 1. *armiger*, Hodgs.
 - b'. Size smaller, forearm about 78 mm. 2. *lylei*, Thos.
 - b. No frontal sac; posterior leaf not narrower than horseshoe 3. *lankadiva*, Kel.
- B.—Size small, forearm less than 75 mm.
- a. Posterior margin of nose-leaf terminating in three sharp points; forearm 44 mm 4. *tridens murriana*, And.
 - b. Posterior margin of nose-leaf rounded.
 - a' Supplementary leaflets on each side of the horseshoe.
 - a. Three leaflets on each side

- a. Surface of posterior nose-leaf divided into two cells; forearm 65 mm 5. *nicobarensis*, Dobs.
- b. Surface of posterior cell divided to four cells.
- a. Posterior leaf narrower than horseshoe; forearm 61 mm. 6. *leptophyllus*, Dobs.
- b. Posterior leaf as wide as horseshoe or wider.
- a. Hinder margin of inter-femoral membrane straight; forearm 50 mm. 7. *speoris*, Schneid.
- b. Hinder margin of inter-femoral membrane a salient angle; forearm 56 mm. 8. *larvatus*, Horsf.
- b. Two leaflets on each side; forearm 44 mm. 9. *brachyotus*, Dobs.
- b¹. No supplementary leaflets.
- a. Ears laid forwards extend to muzzle; forearm 39 mm ... 10. *fulvus*, Gray.
- b. Ears laid forwards do not extend to muzzle; forearm 35 mm ... 11. *amboinensis*, Pet.

DISTRIBUTION :—

1. *H. armiger*, Hodson.

Type locality :—Nepal (Hodgson).

Other localities :—Khasia Hills (B. M.); Kumaon; Darjiling; Chin Hills; Chindwin; Shan States; Mt. Popa (M. S. I.)

Co-types :—B. M. Nos. 43.1.12.132. and 133. (Type of *debilis*, K. Andersen, B. M. No. 79.11.21.80).

Lectotype :—B. M. No. 43.1.12.132.

2. *H. lylei*, Thomas.

Type locality :—Chiengmai, N. Siam. (Lyle).

Other localities :—Shan States (M. S. I.)

Type :—B. M. No. 13.4.18.3.

3. *H. lankadiva*, Kelaart. *Type locality* :—Kandy, Ceylon (Kelaart).
Other localities :—Central Provinces ; Kanara ; Bellary ; Mysore (M. S. I.)
Co-types :—B. M. Nos 52.5.9.11. & 7.1.1.311.
Lectotype :—B. M. No. 7.1.1.311.
4. *H. tridens murraiana*, Andersen. *Type locality* :—Karachi, Sind. (? Murray).
Other localities :—None.
Type :—Ind. Mus. Calc. No. 121 hh.
5. *H. nicobarensis*, Dobson. *Type locality* :—Nicobars (Stoliczka).
Other localities :—None.
Type :—Ind. Mus. Calc. No. 127 a.
6. *H. leptophyllus*, Dobson. *Type locality* :—Khasi Hills, Assam. (Godwin Austen.)
Other localities :—None.
Type :—Ind. Mus. Calc. No. 125a.
7. *H. speoris*, Schneider. *Type locality* :—“Timor and Amboina”.
Other localities :—Dharwar ; Trincomali, Ceylon (B. M.) ; Dharwar ; Kanara ; Bellary ; Mysore ; Coorg ; Ceylon (M. S. I.)
Type :—Unknown. (Co-types of *aureus*, Kelaart, B. M. Nos. 52.5.9.3 & 4 & 5 ; Co-types of *templetoni*, Kelaart, B. M. Nos. 52.1.24.2 & 3 & 4 ; Type of *apiculatus*, Gray, B. M. No. 19.a.b.c.d.f. ; Type of *penicillatus*, Gray, B. M. No. 19e.)
8. *H. larvatus*, Horsfield. *Type locality* :—Java (Horsfield).
Other localities :—Chindwin ; Shan States ; Mt. Popa (M. S. I.)
Type :—B. M. No. 79.11.21.93.
9. *H. brachyotus*, Dobson. *Type locality* :—Central India. (Staples).
Other localities :—Palanpur ; Kanara ; Ceylon ; Bengal (M. S. I.)
Type :—B. M. No. 9.1.4.70. (in al.)
10. *H. fulvus*, Gray. *Type locality* :—Dharwar (Elliot).
Other localities :—Sind ; “Bombay” ; Madras (Jerdon) ; Ceylon ;

Upper Burma (B. M.); Palanpur; Kathiawar; Cutch; Central Provinces; Western Ghats; Dharwar; Kanara; Bellary; Mysore; Ceylon; Sikkim; Darjiling; Bhutan Duars; Bengal; Chindwin; Shan States, Mt. Popa; Tenasserim (M. S. I.)

Type:—B. M. No. 22a.

11. *H. amboinensis*, Peters.

Type locality:—Amboina.

Other localities:—"Dekhan" (B. M.)

Type:—Berlin Museum.

Gen. III. COELOPS.

No. 168, *frithi*, Bly.

The only species of the genus.

DISTRIBUTION:—

C. frithi, Blyth.

Type locality:—Sundarbans, Bengal (Frith).

Other localities:—None.

Type:—Ind. Mus. Calc. No. 132a.

Family III.—MEGADERMATIDÆ.

In 1907 Dr. Andersen and I made a study of the material available in this Family (A. M. N. H. (7), xix., p. 129, 1907) when we decided to revive the genus EUCEIRA to contain the species *lyra*, Geoffroy. Later it was found that the name was pre-occupied in Entomology, so that the next oldest name, LYRODERMA must be substituted for it. These two genera may be distinguished as follows:—

Key to the genera of the MEGADERMATIDÆ.

A.—Posterior termination of nose-leaf rounded. I. MEGADERMA.

B.—Posterior termination of nose-leaf truncated. II. LYRODERMA.

Gen. I.—MEGADERMA.

No. 170. *spasma*, L. Further we found (l. c. *supra.*) that true *spasma*, L., must be limited to the

Celebes and Philippines, and that the subspecific name *trifolium*, must be used for the Indian form.

DISTRIBUTION:—

M. spasma trifolium, Geoffroy. *Type locality*:—Java. (Leschenault).

Other localities:—Western India; Ceylon; S. W.; Siam (B. M.); Dharwar; Kanara; Coorg; Ceylon; Chindwin; Mt. Popa; Pegu; Tenasserim (M. S. I.)

Type:—Unknown. Perhaps in Paris Museum. (*Type* of *horstliedi*, Blyth. B. M. No. 60.5.4.13.)

Gen. II.—LYRODERMA.

No. 169. *lyra*, Geoff. Besides removing *lyca* to this genus, we established a subspecies *caurina*, for the specimens from the West Coast of India which may be distinguished from true *lyra* as follows:—

Key to the subspecies of M. lyra.

- | | | | | | |
|------------------------------------|----------|-----|-----|-----|----------------------------------|
| A.—On the average larger, forearm | 65-69 mm | ... | ... | ... | 1. <i>lyra lyra</i> , Geoff. |
| B.—On the average smaller, forearm | 63-64 mm | ... | ... | ... | 2. <i>lyra caurina</i> , A. & W. |

DISTRIBUTION:—

1. *L. lyra lyra*, Geoffroy.

Type locality:—East Coast of Madras?

Other localities:—Secunderabad; Bengal (B. M.); Palanpur; Khandesh; Central Provinces; Bellary; Mysore; Kumaon; Bengal; Sikkim; Bhutan Duars; Shan States (M. S. I.)

Type:—Unknown. Perhaps in Paris Museum.

2. *L. lyra caurina*, Andersen & Wroughton.

Type locality:—Surat District (Wroughton).

Other localities:—Western Ghats; Dharwar; Kanara (M. S. I.)

Type:—B. M. No. 98.4.2.2.

Family IV.—NYCTERIDÆ.

There is only one genus.

Gen. NYCTERIS.

javonica, Geoff. Though not included in his list, Blanford mentions this species as occurring in the Malay Peninsula (Mamm., p. 295), but Dr. Andersen has separated these northern specimens under the name *tragata* (A. M. N. H. S. x, p. 546, 1912).

DISTRIBUTION:—

- N. tragata*, K. Andersen.

Type locality:—Sarawak, Borneo (C. J. Brooks).

Other localities:—Malay Peninsula (B. M.); Tenasserim (M. S. I.)
Type:—B. M. No. 3.3.31.1.(in al.)

Family V.—VESPERTILIONIDÆ.

Blanford ranged all the species of VESPERTILIONIDÆ in eight genera, but the increase in the number of genera and species since his work was done is so great that it would only cause confusion to try and give equivalents for his genera, I propose therefore to ignore them altogether and to maintain touch with him only through his numbered species. The latest work on the classification of the CHIROPTERA is Miller's "The Families and Genera of Bats", 1907, which I have here followed as closely as possible so far as it deals with our fauna. Miller recognises four subfamilies of the VESPERTILIONIDÆ, which may be arranged in a key as follows:—

Key to the subfamilies of the VESPERTILIONIDÆ.

- A.—Nostrils elongated, tubular ... II. MURINÆ.
 B.—Nostrils not elongated.
 a.—Ears funnel-shaped ... III. KERIVOULINÆ.
 b.—Ears not funnel-shaped.
 a¹.—Second phalanx of third finger
 nearly three times as long as
 first ... IV. MINIOPTERINÆ.
 b¹.—Second phalanx of third finger
 not elongated ... I. VESPERTILIONINÆ.

Subfamily I.—VESPERTILIONINÆ.

In this subfamily Miller recognised 16 Genera (two of them by different names to those used here), which may be arranged in a key as follows:—

Key to the Genera of the VESPERTILIONINÆ.

- A.—Cheek teeth six, on each side, above and below.
 a. Feet large ... XVI. LEUCONOE.
 b. Feet normal ... XV. MYOTIS.
 B.—Cheek teeth less than six on each side above and below.
 a. Upper premolars 2-2.
 a¹ Lower premolars 3-3 ... II. PLECOTUS.
 b¹ Lower premolars 2-2.
 a². Outer, upper incisor not extending beyond cingulum of inner. XI. SCOTOZOUS.
 b². Outer, upper incisor extending distinctly beyond cingulum of inner.

- a*³. 5th finger only a little longer than metacarpal of 4th and 3rd VII NYCTALUS.
- b*³. 5th finger longer than metacarpal and 1st phalanx of 4th and 3rd.
- a*⁴. Upper surface of rostrum concave; ears joined ... I. BARBASTELLA.
- b*⁴. Upper surface of rostrum convex; ears separate.
- a*⁵. Outer upper incisor normal in position, its concavity directed backwards VIII. PIPISTRELLUS.
- b*⁵. Outer upper incisor pushed outwards from its normal position, the concavity directed outwards IX. GLISCHROPUS.
- b*. Upper premolars 1-1.
- a*¹. Upper incisors 2-2.
- a*². Skull noticeably flattened; soles of feet expanded into fleshy pads. VI. TYLONYCTERIS.
- b*². Skull not noticeably flattened; soles of feet normal.
- a*³. Outer upper incisor large, crowded inward between inner incisor and canine X. HESPEROPTENUS.
- b*³. Outer upper incisor small, on outer side of inner incisor and separated from canine.
- a*⁴. Rostrum evenly convex laterally; palatal emargination deeper than broad ... VI. EPTESICUS.
- b*⁴. Rostrum noticeably concave on each side of middle line; palatal emargination broader than deep ... V. VESPERTILIO.
- b*¹. Upper incisors 1-1.
- a*². Ears noticeably enlarged ... III. OTONYCTERIS.
- b*². Ears not noticeably enlarged.
- a*³. 1st and 2nd upper molars with "W" pattern distorted or nearly absent XII. SCOTOPHILUS.
- b*³. 1st and 2nd upper molars with "W" pattern not distorted.

*a*⁴. Depth of maxillary emargination equal to distance between canines ... XIII. SCOTEINUS.

*b*⁴. Depth of maxillary emargination scarcely more than half the distance between canines ... XIV. SCOTOMANES.

Gen. I. BARBASTELLA. Blanford uses the name SYNOTUS for this Genus.

No. 172. *darjelingensis*, Hodgs. The sole species.

DISTRIBUTION :—

B. darjelingensis, Hodgson. *Type locality* :—Nepal (Hodgson).
Other localities :—Muree; Rajputana (B. M.); Darjiling; Bhutan Duars (M. S. I.).
Type :—B. M. No. 54.9.1.13.

Gen. II.—PLECOTUS.

Hodgson gave the name *homochrous* to No. 171, *auritus*, L. the Nepal form (J. B. N. H. S., xxiii., p. 288, 1914). Barrett Hamilton described a species *puck* from the Punjab, (A. M. N. H. (7) xx. p. 521. 1907) and Thomas another, *wardi*, from Ladak. (A. M. N. H. (8) vii. p. 289, 1911). These may be arranged in a key as follows :—

Key to the species of PLECOTUS.

- A.—Size smaller, forearm 40 mm or less; colour darker.
- a.* Size larger, forearm 40 mm ... 1. *homochrous*,
Hodgs.
 - b.* Size smaller forearm 38 mm ... 2. *puck*, B. Ham.
- B.—Size larger, forearm 43 mm; colour paler. 3. *wardi*, Thos.

DISTRIBUTION :—

1. *P. homochrous*, Hodgson. *Type locality* :—Nepal (Hodgson).
Other localities :—Kumaon (M.S.I.).
Type :—B. M. No. 54.9.1.1.
2. *P. puck*, Barrett Hamilton. *Type locality* :—Muree, Punjab (Birrell).
Other localities :—None.
Type :—B. M. No. 5.11.19.1.
3. *P. wardi*, Thomas. *Type locality* :—Leh, Ladak (Ward-Crumph).
Other localities :—None.
Type :—B. M. No. 6.10.3.2.

NOTE:—There is some doubt whether *homochrous* and *puck* are really separable but with such poor material a confident decision is impossible. Series of these long-eared bats are a great desideratum.

Gen. III.—OTONYCTERIS.

No. 173. *hemprichi*, Pet. The sole Indian representative of the Genus.

DISTRIBUTION:—

O. hemprichi, Peters. *Type locality*:—N. E. Africa.
Other localities:—Gilgit (Biddulph) (B.M.)
Type:—Berlin Museum.

Gen. IV.—EPITESICUS.

No. 174. *serotinus*, Sschreb. Substituting *pachyomus*, Tomes's name for the Indian form of *serotinus*,
 No. 175. *nasutus*, Dobs. these five species may be arranged in a key as follows:—
 No. 176. *borealis*, Nils.
 No. 178. *atratus*, Blyth.
 No. 179. *pachyotis*, Dobs.

Key to the species of EPITESICUS.

A.—No thickened base to ear.

a. Size larger, forearm 50 mm or more... 1. *pachyomus*, Tomes.

b. Size smaller, forearm less than 50 mm.

*a*¹. No postcalcaneal lobe; forearm 36 mm. ... 2. *nasutus*, Dobs.

*b*¹. A postcalcaneal lobe present.

*a*². Ears much shorter than the head; forearm 38 mm. ... 3. *borealis*, Nils.

*b*². Ears nearly as long as head; forearm 42 mm. ... 4. *atratus*, Blyth.

B.—Base of ear thickened; forearm 40 mm. 5. *pachyotis*, Dobs.

DISTRIBUTION:—

1. *E. pachyomus*, Tomes. *Type locality*:—Rajputana (Boys).
Other localities:—Kashmir (B. M.)
Type:—B. M. No. 48. 2.18.7. Co-types of *andersoni*, Dobson, Ind. Mus. Calc. No. 141. a. & b.
 2. *E. nasutus*, Dobson. *Type locality*:—Shikarpur. Sind (Blanford).
Other localities:—None.
Type:—Ind. Mus. Calc. No. 142. a.

3. *E. borealis*, Nilsson. *Type locality*:—Scandinavian Peninsula.
 Other localities:—Gilgit (Scully)
 Type:—Unknown.
4. *E. atratus*, Blyth. *Type locality*:—Darjiling (Stoliczka)
 Other localities:—None.
 Co-types:—Ind. Mus. Calc. 143.
 a. & b.
5. *E. pachyotis*, Dobson. *Type locality*:—Khasi Hills, Assam (Bourne).
 Other localities:—None.
 Co-types:—Ind. Mus. Calc. No. 145. a. & b.

Gen. V.—VESPERTILIO.

Blanford uses the name in quite a different sense.

The name *murinus*, L., is now generally accepted for this species, which appears to be identical with the European form, and which scarcely enters our area.

DISTRIBUTION:—

- V. murinus*, Linnæus. *Type locality*:—Northern Europe.
 Other localities:—Gilgit (Scully).
 Type:—Unknown.

Gen. VI.—TYLONYCTERIS.

Temminck's name is that of the No. 180, *pachypus*, Temm. Java form. Recently Thomas made an attempt to assign these bats to several existing species but further specimens received later did not altogether support his conclusions and it was decided (J. B. N. H. S., xxiv., p. 778, 1916) to use *fulvida*, Blyth, for all Indian animals except those from the West Coast, for which Thomas has provided the name *avrex* (A. M. N. H. S., xv, p. 228, 1915). These two forms may be distinguished as follows:—

Key to the species of TYLONYCTERIS.

- A.—Colour darker, deep rufous 1. *fulvida* Blyth.
 B.—Colour paler, brownish gold 2. *avrex*, Thos.

DISTRIBUTION :—

1. *T. fulvida*, Blyth. *Type locality*:—Shwe Gayen, Burma. (Maj. Berdmore).
Other localities:—Manipur (B. M.); Sikkim; Darjiling; Chin Hills; Chindwin; Shan States; Pegu; Tenasserim (M. S. I.).
Co-types:—Ind. Mus. Calc. No. 146. a-e.
2. *T. aureæ*, Thomas. *Type locality*:—Belgaum (Wroughton).
Other localities:—Sirsi, Kanara (B. M.) Dharwar; Kanara; Coorg (M. S. I.).
Type:—B. M. No. 0.4.2.15.

Gen. VII.—NYCTALUS.

Schreber's species is the European form, Hodgson gave the name *No. 181. noctula*, Schreb. *pean form*, Hodgson gave the name *No. 182. leisleri*, Kuhl. *labiatus* to the Indian one and Thomas has recently added a third species. These may be arranged, by size, as follows:—

Key to the species of NYCTALUS.

- A.—Large, forearm 50 mm. or more ... 1. *labiatus*, Hodgs.
B.—Small, forearm 41 mm. or under.
a.—Forearm 41 mm. ... 2. *leisleri*, Kuhl.
b.—Forearm 39 mm. ... 3. *joffrei*, Thomas.

DISTRIBUTION :—

1. *N. labiatus*, Hodgson. *Type locality*:—Nepal (Hodgson).
Other localities:—Kashmir (B. M.); Kalimpong, Darjiling; Chin Hills (M. S. I.).
Type:—B. M. No. 43.1.12.146.
2. *N. leisleri*, Kuhl. *Type locality*:—Hanau, Germany.
Other localities:—Murree, Punjab; Mussoorie (Hutton) (B. M.).
Type:—Unknown.
3. *N. joffrei*, Thomas. *Type locality*:—Chin Hills (MacKenzie).
Other localities:—Chiu Hills (M. S. I.).
Type:—B. M. No. 16.3.26.2.

Gen. VIII.—PIPISTRELLUS.

No. 183. <i>mordax</i> , Pet.	The Indian representative of <i>ab-</i>
No. 184. <i>affinis</i> , Dob.	<i>ramus</i> , Temm. (which is a Japa-
No. 185. <i>circumdatu</i> s, Temm.	nese species) is <i>coromandra</i> , Gray.
No. 186. <i>ceylonicus</i> , Kel.	I established a species <i>mimus</i> , for
No. 187. <i>abramus</i> , Temm.	a dwarf form of <i>coromandra</i> , (J.
No. 188. <i>pipistrellus</i> , Schreb.	B. N. H. S., xii., p. 722, 1900),
No. 189. <i>kulli</i> , Natt.	and later a subspecies of it, <i>glau-</i>
No. 190. <i>annectens</i> , Dobs.	<i>cillus</i> , (J. B. N. H. S., XXI., p. 768,
	1912). Thomas has made several

new species, *viz.*, *lophurus*, *cadornæ*, *shanorum*, *babu*, and *patercul*us, on specimens obtained by the Survey, and has recognised four subspecies of Kelaart's *ceylonicus* (J. B. N. H. S., xxiii, p. 413, 1915). This raises the number of recognised forms to 20, which may be arranged in a key as follows:—

Key to the species of PIPISTRELLUS.

- 1.—Size large, forearm about 40 mm.
 - a. Tragus very broad, about 4mm; colour black and hoary; forearm 40mm... 1. *mordax*, Pet.
 - b. Tragus narrower.
 - a¹. Tragus pointed above; forearm 40 mm. 2. *annectens*, Dobs.
 - b¹. Tragus rounded at tip.
 - a². Colour black; forearm 41 mm.... 3. *circumdatu*s, Temm.
 - b². Colour brown.
 - a³. Outer upper incisors acutely pointed; forearm 39 mm. ... 4. *affinis*, Dobs.
 - b³. Outer upper incisors hollowed to receive lower canine.
 - a⁴. Skull smaller and slighter; anterior premolar smaller; forearm 37 mm. ... 5. *shanorum*, Thos.
 - b⁴. Skull larger and stouter; anterior premolar larger.
 - a⁵. Colour brown.
 - a⁶. Smaller.
 - a⁷. Colour darker, forearm 37 mm. ... 6. *ceylonicus ceyloni-*
cus, Kel.
 - b⁷. Colour paler, forearm 37 mm. ... 7. *c. chrysothrix*, Wr.
 - b⁶. Larger, forearm 40 mm. 8. *c. indicus*, Dobson.
 - b⁵. Colour grey, forearm 38 mm. 9. *c. subcaucus*, Thomas

- b.*—Size small, forearm about 35 mm.
or less.
- a.* Size larger, forearm about 35 mm.
- a*¹. A dorsal gland at root of tail, forearm 35 mm. ... 10. *lophurus*, Thomas.
- b*¹. No dorsal gland.
- a*². Interfemoral membrane edged with white, forearm 35 mm.
- a.* Colour darker ... 11. *kukli kukli*, Natterer.
- b.* Colour paler ... 12. *kukli lepidus*, Blyth.
- b*². Interfemoral membrane not edged with white, forearm 35 mm. ... 13. *babu*, Thomas.
- b.* Size smaller, forearm 33 mm. or less.
- a*¹. Tragus very broad, about 4 mm.; forearm 33 mm.
- a*². Colour rich brown ... 14. *cadornæ*, Thos.
- b*². Colour black, hoary ... 15. *austenianus*, Dobs.
- b*¹. Tragus narrower.
- a*². Outer margin of ear, below tip, concave; forearm 31 mm. ... 16. *pipistrellus*, Schreb.
- b*². Outer margin of ear, below tip, straight.
- a*³. Anterior premolar not entirely inside the tooth row: interior incisor not reaching as high as outer cusp of outer incisor; forearm 31·5 mm. ... 17. *paterculis*, Thos.
- b*³. Anterior premolar entirely inside tooth row; interior incisor reaching higher than outer cusp of outer incisor.
- a*⁴. Skull longer (12·5 mm.): tooth row longer: forearm 29-33 mm. ... 18. *coromandra*, Gray.
- b*⁴. Skull shorter (11·5 mm.): tooth row shorter; forearm 27-29 mm.
- a.* Colour bistre brown ... 19. *mimus mimus*, Wr.
- b.* Colour mouse grey ... 20. *m. glaucillus*, Wr.

DISTRIBUTION :—

1. *P. mordax*, Peters. *Type locality* :—Java.
Other localities :—Kumaon ; Calcutta (B. M.) ; Darjiling (M. S. I.).
Type :—Berlin Museum.
2. *P. annectens*, Dobson. *Type locality* :—Naga Hills, Assam (Capt. Butler).
Other localities :—None.
Type :—Ind. Mus. Calc. No. 155a.
3. *P. circumdatus*, Temminck. *Type locality* :—Java.
Other localities :—“ India” (Jerdon) (B. M.).
Type :—Leyden Museum.
4. *P. affinis*, Dobson. *Type locality* :—Bhamo, Upper Burma (W. Yunnan Exped.—Anderson).
Other localities :—None.
Type :—Ind. Mus. Calc. No. 151a.
5. *P. shanorum*, Thomas *Type locality* :—Pyaung-gaung, N. Shan States. (B. N. H. S.—Shortridge.)
Other localities :—Shan States (M.S.I.).
Type :—B. M. No. 14.7.8.6.
6. *P. ceylonicus ceylonicus*, Kelaart. *Type locality* :—Ceylon (Kelaart).
Other localities :—Panduloya, Ceylon (B. M.).
Type :—Lost.
7. *P. ceylonicus indicus*, Dobson. *Type locality* :—Mangalore, Malabar Coast (Dobson).
Other localities :—Ratnagiri ; Belgaum ; Kanara (B. M.) ; Kanara Coorg (M.S.I.)
Type :—B. M. No. 9.1.4.73.
8. *P. ceylonicus chrysothrix*, Wroughton. *Type locality* :—Mheskatri, Surat Dangs (Wroughton).
Other localities :—Bulsar ; Surat Dist. ; Nawapur, Khandesh ; Bombay ; Poona ; Satara ; Dharwar (B. M.) ; Khandesh ; Berars ; Satara ; Dharwar ; Mysore ; Bengal (M. S. I.).
Type :—B. M. No. 98.5.5.3.

9. *P. ceylonicus subcanus*,
Thomas. *Type locality*:—Junagadh State,
Kathiawar. (B. N. H. S.—Crump.)
Other localities:—Sind; Cutch;
Palanpur (M.S.I.).
Type:—B. M. No. 13.8.8.30.
10. *P. lophurus*, Thomas. *Type locality*:—Maliwun, S.
Tenasserim (B. N. H. S.—Short-
ridge).
Other localities.—None.
Type.—B. M. No. 14.12.1.6.
11. *P. kuhli kuhli*, Natterer. *Type locality*:—Trieste, Austria-
Hungary.
Other localities:—Khairpur,
Sind (M. S. I.).
Type:—Unknown. (Co-types of
canus, Blyth, Ind. Mus. Calc. Nos.
154. a. and b.; Type of *leucotis*
Dobson, Ind. Mus. Calc. No.
154. p.)
12. *P. kuhli lepidus*, Blyth. *Type locality*:—Kandahar (Hut-
ton.)
Other localities:—Kashmir. Up-
per Sind Frontier (M. S. I.).
Type:—Unknown.
13. *P. babu*, Thomas. *Type locality*:—Murree, 8,000',
Punjab (Maj. Dunn).
Other localities:—Garial, Pun-
jab; Mussoorie (Hutton); Simla;
Nepal (Hodgson); Darjiling
(Blyth); Sylhet (B. M.); Central
Provinces; Darjiling; Bhutan
Duars (M. S. I.)
Type:—B. M. No. 7.11.21.2.
14. *P. cadornæ*, Thomas. *Type locality*:—Pashok, 3,500'.
Darjiling (B. N. H. S.—Baptista).
Other localities:—None.
Type:—B. M. No. 16.3.25.6.
15. *P. austeniannus*.
Dobson. *Type locality*:—Cherrapunji. As-
sam (Godwin-Austen).
Other localities:—Shan States
(M. S. I.).
Type:—Ind. Mus. Calc. No.
150.b.
16. *P. pipistrellus*.
Schreber. *Type locality*:—France.

- Other localities*:—No Indian specimen in B. M.
Type:—Unknown.
17. *P. puterculus*, Thomas. *Type locality*:—Mt. Popa, Burma. (B. N. H. S.—Shortridge.)
Other localities:—Chindwin; Shan States; Mt. Popa (M. S. I.).
Type:—B. M. No. 14.7.19.242.
18. *P. coromandra*, Gray. *Type locality*:—Coromandel Coast.
Other localities:—Surat; Bombay; Ratnagiri (B. M.); Dharwar; Mysore; Coorg; Ceylon; Kumaon; Bengal; Sikkim; Darjiling; Bhutan Duars (M. S. I.).
Type:—Unknown. Perhaps in Paris Museum (the name is a renaming of F. Cuvier's *Vespertilio de Coromandel*).
19. *P. minus minus*,
Wroughton. *Type locality*:—Mheskatri, Surat Dangs (Wroughton).
Other localities:—Surat; Khandesh; Poona (B.M.); Cutch; Palanpur; Kathiawar; Khandesh; Berars; Central Provinces; Dharwar; Kanara; Bellary; Mysore; Coorg; Ceylon; Kumaon; Bengal; Sikkim; Bhutan Duars; Chin Hills; Chindwin (M. S. I.).
Type:—B. M. No. 98. 5.5.6.
20. *P. minus glaucillus*,
Wroughton. *Type locality*:—Multan, Punjab (Maj. Dunn).
Other localities:—Sind (M. S. I.).
Type:—B. M. No. 10.1.18.15.

Gen. IX.—GLISCHROPUS.

Though Blanford does not mention this bat in the body of his work, he refers to it, under the name *Vesperugo tylopus*, Dobson, in the appendix (Mamm., p. 602). I can find no mention otherwise within our area, though Thomas has recorded it from Perak (Journ. F. M. S. Mus., vii., p. 2, 1916).

DISTRIBUTION:—

G. tylopus, Dobson.

Type locality:—Northern Borneo.
Other localities:—Biapo, Karennee, (Thomas-Fea.)
Type:—B. M. No. 71.2.10.2.

Gen. X.—HESPEROPTENUS.

These two species can be easily separated by size. Section C of Blanford's key may therefore be adopted as it stands, viz. :—

Key to the species of HESPEROPTENUS.

- A.—Size large, forearm 53 mm. ... 1. *tickelli*, Blyth.
 B.—Size small, forearm 28 mm. ... 2. *blanfordi*, Dobs.

DISTRIBUTION :—

1. *H. tickelli*, Blyth. *Type locality* :—Chaibassa, "Central India" (Tickell).
Other localities :—Rajputana; Thana District, Bombay; Kanara; Madras (Jerdon) (B. M.); Dharwar; Kanara; Ceylon; Bengal; Bhutan Duars (M.S.I.)
Co-types :—Ind. Mus. Calc. No. 156. a. b. and c.
2. *H. blanfordi*, Dobson. *Type locality* :—Tenasserim.
Other localities :—Malay Peninsula (B. M.)
Type :—Ind. Mus. Calc. No. 157. a.

Gen. XI.—SCOTOZOUS.

No. 193. *dormeri*, Dobs. Thomas lately, in providing a new subspecies for the Northern form of *dormeri*, i.e., *caurinus*, decided to follow Miller and accept SCOTOZOUS as a full genus (J. B. N. H. S., xxiv., p. 33. 1915). These two forms may be distinguished as follows :—

Key to the forms of SCOTOZOUS.

- A.—Skull and teeth rather smaller; colour brown ... 1. *d. dormeri*, Dobs.
 B.—Skull and teeth rather larger; colour hoary grey ... 2. *d. caurinus*, Thos.

DISTRIBUTION :—

1. *S. dormeri dormeri*, Dobson. *Type locality* :—Bellary Hills, Southern India (Dormer).
Other localities :—Berars (Blanford); Surat and Konkan; Bombay (B. M.); Khandesh; Berars; Central Provinces; Dharwar; Bellary; Bengal; Bhutan Duars (M. S. I.)
Type :—B. M. No. 65.5.20.3.

2. *S. dermeri caurinus*, Thomas. *Type locality*:—Junagadh State, Kathiawar, (B.N.H.S.—Crump).
Other localities:—Cutch; Kathiawar; Palanpur (M. S. I.)
Type:—B. M. No. 13.8.8.32.

Gen. XII.—SCOTOPHILUS.

No. 194. *kuhli*, Leach. This is the only species in Blandford's work which comes into the genus SCOTOPHILUS as now accepted. The species *heathi* and *castaneus*, included by him in the synonymy of *kuhli*, must be revived to represent the forms of South India and Tenassarim, respectively, while Thomas has added a species *wroughtoni*. (J. B. N. H. S., xi., p. 274, 1897). These four forms may be arranged in a key as follows:—

Key to the species of SCOTOPHILUS.

- A.—Size large, forearm 65 mm. ... 1. *heathi*, Horsf.
 B.—Size smaller.
 a. Size larger, forearm 58-62 mm. ... 2. *kuhli*, Leach.
 b. Size smaller, forearm 50 mm.
 a'. Colour chestnut above and below. 3. *castaneus*, Horsf.
 b'. Colour almost white below ... 4. *wroughtoni*, Thos.

DISTRIBUTION:—

1. *S. heathi*, Horsfield. *Type locality*:—"Madras" (Heath).
Other localities:—Rajputana (Boys) (B. M.)
Co-types:—B. M. No. 7.1.1. 446 & 447.
Lectotype:—B. M. No. 7.1.1. 446.
2. *S. kuhli*, Leach. *Type locality*:—Unknown.
Other localities:—Khandesh; Sehore, C. I. (Whitehead); Ajunta Caves; Dekhan (Sykes); Surat; Thana; Kanara; Travancore; Trichinopoly; Ceylon (Layard); Bengal; Malay; Siam (B.M.) Sind; Cutch; Palanpur; Khandesh; Central Provinces; Mysore; Kanara; Kumaon; Ben-

gal; Sikkim; Bhutan Duars; Chin Hills; Chindwin; Mt. Popa; Shan States.

Type:—B. M. not registered. No. a. of Dobson's catalogue.

3. *S. castaneus*, Horsfield.

Type locality:—Malacca.

Other localities:—Malay Peninsula; Siam (B. M.); Tenasserim (M. S. I.)

Type:—B. M. No. 79.11, 21. 116.

4. *S. wrightoni*, Thomas.

Type locality:—Kim, Surat, (Wroughton).

Other localities:—Surat, Khandesh, Thana, Poona, Satara Districts, Bombay (B. M.), Palanpur; Kathiawar; Khandesh; Central Provinces; Dharwar; Kanara; Mysore; Coorg; Ceylon; Bengal; Kumaon; Sikkim, Bhutan Duars; Mt. Popa (M.S.I.)

Type:—B. M. No. 97.6.8. 12.

Gen. XIII.—SCOTEINUS.

No. 195. *emarginatus*, Dobs.

No. 196. *pallidus*, Dobs.

These two species, the only ones found within our area, are easily distinguished by size as follows:—

Key to the species of SCOTEINUS.

- A.—Larger, forearm 55 mm. 1. *emarginatus*, Dobs.
 B.—Smaller, forearm 35 mm. 2. *pallidus*, Dobs.

DISTRIBUTION:—

1. *S. emarginatus*, Dobson.

Type locality:—"India."

Other localities:—None.

Type:—Ind. Mus. Calc. No. 160. a. (in al.)

2. *S. pallidus*, Dobson.

Type locality:—Mian Mir, Punjab (J. S. Gunn).

Other localities:—Northern Sind Frontier (M. S. I.).

Type:—Ind. Mus. Calc. No. 161. a.

Gen. XIV.—SCOTOMANES.

No. 197. *ornatus*, Blyth. The only species.

DISTRIBUTION :—

S. ornatus, Blyth.

Type locality :—Darjiling.

Other localities :—China ; Sikkim (B. M.) ; Sivok, Bengal (M. S. I.).

Type :—Ind. Mus. Calc. No. 162. a.

Gen. XV.—MYOTIS.

Thomas has recently advocated the separation in a distinct genus, LEUCONOE, of the species with abnormally large feet. (J. B. N. H. S. xxiii, p. 607, 1915).

No. 207. *nepalensis*, Dobs.

Miller in his "Mammals of Western European" 1912, placed

No. 208. *murinus*, L.*murinus* as a synonym of *myotis*, and Thomas (l.c.) indicated *blythii*.No. 209. *dobsoni*, Trouess.Tomes, as the Indian representative of *myotis*. Both Blanford and Thomas regard *dobsoni*, Trouessart, (i.e.,No. 210. *formosus*, Hodgs.No. 211. *mystacinus*, Leisl.No. 212. *muricola*, Hodgs.*murinoides*, Dobs.) as merely an aberrant individual of *blythii*, and I therefore omit it. Similarly Thomas has indicated *caliginosus*, Tomes, and *siligorensis*, Tomes, as the representatives of *mystacinus*, Leisler. I have described a species, *peytoni*, from Kanara, and Thomas one from Darjiling, under the name of *sicarius*. These seven species may be arranged in a key as follows :—

These seven species may be arranged in a key as follows :—

Key to the species of MYOTIS.

A. Size large, forearm 40-57 mm.

a. Colour pale, fawn or clay colour.

a¹. Larger, forearm 57 mm. 1. *blythii*, Tomes.b¹. Smaller, forearm 42 mm. 2. *formosus*, Hodgs.

b. Colour dark-brown.

a¹. Under side pale 3. *sicarius*, Thos.b¹. Equally dark above and below 4. *peytoni*, Wr.

B. Size small, forearm 32-35 mm.

a. Under side pale, silvery ...

... 5. *muricola*, Hodgs.

b. Equally dark above and below.

a¹. Forearm 32 mm. 6. *caliginosus*, Tomes.b¹. Forearm 35 mm. 7. *siligorensis*, Tomes.

DISTRIBUTION :—

1. *M. blythii*, Tomes. *Type locality* :—Nasirabad, Rajputana (Boys).
 Other localities :—Simla (B. M.).
 Type :—B. M. No. 48.8.18.6.
 (Type of *nurinoides*, Dobson, Ind. Mus. Calc. No. 176. a.)
2. *M. formosus*, Hodgson. *Type locality* :—Nepal (Hodgson).
 Other localities :—Dharmasala, Punjab ; Mussoorie (B. M.).
 Type :—B. M. No. 43.1.12.141.
3. *M. sicarius*, Thomas. *Type locality* :—Northern Sikkim (Mandelli).
 Other localities :—None.
 Type :—B. M. No. 91.10.17.56.
4. *M. peytoni*, Wroughton. *Type locality* :—Gersoppa Falls, Kanara (B. N. H. S.—Shortridge).
 Other localities :—Gersoppa Falls, Kanara (M. S. I.)
 Type :—B. M. No. 12.8.25.1.
5. *M. auricola*, Hodgson. *Type locality* :—Nepal (Hodgson).
 Other localities :—Bhutan Duars ; Tenasserim (M. S. I.).
 Type :—B. M. No. 45.1.8.143.
6. *M. caliginosus*, Tomes. *Type locality* :—“India”.
 Other localities :—Simla, Punjab ; Sikkim (B. M.).
 Type :—B. M. No. 7.1.1.512.
 (Co-types of *blanfördi*, Dobson, B. M. Nos. 75.10.27.1. & 2. Type of *Nipalensis*, Dobs. Ind. Mus. Cal. 172. a.)
7. *M. siliyorensis*, Tomes. *Type locality* :—Darjiling.
 Other localities :—Sikkim (B. M.). Kumaon (M. S. I.)
 Type :—B. M. No. 79.11.21.125.

Gen. XVI.—LEUCOXOE.

- No. 203. *hasselti*, Temm. Thomas has recently dealt with this Genus in this Journal (J. B. N. H. S., xxiii, p. 610, 1915). and he there points out that it is most doubtful whether *daubentoni* reaches our region at all. He also gives reasons for considering that *longipes* and *megalopus* are one species. Two spe-

cies, viz., *dryas* and *peshwa*, have been added since Blanford wrote. This makes a total of four species which may be arranged in a key as follows :—

Key to the species of LEUCONOE.

- A. Size larger, forearm 40 mm.
 a. Colour paler ; hindfoot longer, 13 mm. ; middle premolar crushed inwards, less than one-third the size of first premolar... 1. *hasselti*, Temm.
 b. Colour darker ; hindfoot shorter 11 mm. ; middle premolar not or little crushed inwards, at least two-thirds the size of the first premolar 2. *peshwa*, Thos.
- B. Size smaller, forearm 36 or 37 mm.
 a. Slightly larger, forearm 37 mm. ; underside almost as dark as upper ; general colour dark ; skull length 15 mm 3. *dryas*, K. And.
 b. Slightly smaller, forearm 36 mm. ; underside silvery ; general colour pale ; skull length 14 mm. 4. *longipes*, Dobson.

DISTRIBUTION :—

1. *L. hasselti*, Temminck. *Type locality* :—Java.
Other localities :—Northern, Central and Eastern Provinces, Ceylon (M.S.I.)
Type :—Leyden Museum.
2. *L. peshwa*, Thomas. *Type locality* :—Poona, Bombay (Wroughton).
Other localities :—None.
Type :—B. M. No. 0.9.16.1.
3. *L. dryas*, K. Andersen. *Type locality* :—Andamans.
Other localities :—None.
Co-type :—B. M. No. 6.12.1.31.
 (Other co-type in Genoa Museum).
4. *L. longipes*, Dobson. *Type locality* :—Caves of Bhima Devi, Kashmir.
Other localities :—None.
Co-type :—B. M. No. 76.3.10.4.
 (Type of *megalopus*, Dobson, B. M. No. 73.4.16.13.)

(To be continued)